

California Interagency Working Group on Indoor Air Quality

Meeting Notes **June 12, 2002**

Department of Health Services Laboratory Facility
2151 Berkeley Way, Berkeley

GENERAL ANNOUNCEMENTS

SPECIAL PRESENTATION

AGENCY REPORTS ON CURRENT IAQ ACTIVITIES

California Air Resources Board / IAQ & Personal Exposure Assessment Program
California Department of Health Service / Environmental Health Investigations Branch
California Department of Health Service / Indoor Air Quality Section
California Department of Health Service / Occupational Health Branch
California Department of Industrial Relations (Cal/OSHA)
California Integrated Waste Management Board / Green Building Program
California Office of Environmental Health Hazard Assessment / Indoor Air Risk Assessment
EPRI (formerly Electric Power Research Institute)
Lawrence Berkeley National Laboratory / Indoor Environments Program
Stanford University / Department of Statistics
U.S. EPA Region IX / Indoor Environment Team

WORKING GROUP COMMITTEES

Indoor Environmental Quality of Schools
Building Design and Operations

FUTURE MEETINGS

GENERAL ANNOUNCEMENTS

IAQ Legislation.

AB 2223. See [IEQ in School Committee](#) report below.

AB 2332, which would have established an indoor air pollution prevention program, including education, community outreach, and emission standards for building materials and consumer products under ARB, was defeated in the Assembly Floor vote. See

http://www.leginfo.ca.gov/cgi-bin/postquery?bill_number=ab_2332&sess=CUR&house=B.

Upcoming Conferences:

- **The Impact of the Human Genome Project on Public Health and Environmental Protection**, Tuesday, June 18, 2002, at the CalEPA Headquarters in Sacramento, http://www.oehha.ca.gov/public_info/genome.html
- The **Ninth International Conference on Indoor Air Quality and Climate (*Indoor Air 2002*)** takes place June 30 to July 5, 2002, in Monterey, California. The conference web site is <http://www.indoorair2002.org/>. CIWG-IAQ members will be presenting papers on a wide range of topics at the conference; see paper titles below:
 - [CDHS IAQS](#)
 - [EPRI](#)
 - [LBNL-IED](#)
 - [OEHHA](#)
 - [U.S. EPA](#)
- The **ISEA/ISEE 2002 Conference** will take place August 11-15, 2002, in Vancouver, British Columbia. This will be a combined annual meeting for the two sponsoring organizations: 11th International Society of Exposure Analysis (<http://iseaweb.org/>) and 14th International Society for Environmental Epidemiology (<http://www.iseepi.org/>). The conference web site is <http://www.iseepi.org/index1.htm>.
- The U.S. EPA will host its **3rd Annual Indoor Air Quality Tools for Schools National Symposium** on August 8-10, 2002, at the Grand Hyatt Hotel in Washington, D.C. The conference information can be found at <http://www.epa.gov/iaq/schools/symposium.html>.

SPECIAL PRESENTATION

None given at March or June meetings.

AGENCY REPORTS ON CURRENT IAQ ACTIVITIES

California Air Resources Board / Indoor Air Quality & Personal Exposure Assessment Program

<http://www.arb.ca.gov/research/indoor/indoor.htm>

-- Peggy Jenkins (mjenkins@arb.ca.gov)

Cal/EPA Children's Environmental Health Awareness Day. Cal/EPA sponsored a one-day event in April to highlight the many projects currently underway within the Cal/EPA boards, departments, and offices related to measuring and addressing children's exposures to environmental contaminants. ARB staff prepared posters on the many projects underway at the ARB (see below), manned a booth with public education materials on children's exposures to air pollutants and the resultant health impacts, and made several overview presentations in the main auditorium throughout the day. Contact: Peggy Jenkins (mjenkins@arb.ca.gov)

Portable Classrooms Study. Field work has been completed in the study, however, the preparation of the study report is behind schedule due to a variety of unavoidable delays including the September 11 attack and various lab difficulties. Some lab analyses are still underway by the contractor, but they have begun data analysis on other data collected in Phase II. Study design information was presented at the Cal/EPA Children's Health Awareness Day in April 2002, and the OEHHA Children's Environmental Health Symposium in May, 2002. See also related item under DHS. Contact: Tom Phillips (tphillip@arb.ca.gov).

Sustainable Building Task Force. The Secretaries of Cal/EPA and the State and Consumer Services Agency (SCSA) and their relevant staff met to discuss the progress of the Sustainable Building Task Force to date, updates on the Task Force's Action Plan, and the annual report to the Governor. ARB highlighted its work on the California Portable Classrooms Study, the Stationary Fuel Cell Collaborative, the installation of electric vehicle charging stations at state buildings, and work on various subcommittees of the Task Force. New actions proposed for the upcoming year included "greening" of the State's vehicle fleet, low-toxicity and low-odor cleaning products, stormwater management, and improved building management. Cal/EPA expressed continued commitment to carrying out the Action Plan.

ARB responded to a questionnaire from SCSA regarding ARB's sustainable building activities and accomplishments over the last year. This information will be used in the annual report to the Governor on the implementation of the Executive Order on State Sustainable Buildings. ARB staff also participated in meetings of the Task Force and its Technical Committee, commenting on the list of pre-approved sustainable building features for State building projects (the Tiers lists). ARB recommended specific inclusion of various indoor environmental quality measures, and provided recommended measures for electric and natural gas vehicle facilities and nitrogen oxide limits for boilers. Contact: Tom Phillips (tphillip@arb.ca.gov).

SB25 Indoor and Personal Monitoring Study. Field work will be completed in June for the SB25 indoor and personal monitoring study. The lead investigator, Dr. Steve Colome from UCLA,

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measured PM_{2.5}, PM₁₀, elemental carbon/organic carbon, VOCs, carbon monoxide, and aldehydes at three schools in SB25 communities. Monitoring is being conducted in Boyle Heights and Wilmington in the Los Angeles area, and Crockett in northern California. At each school, weekly air samples are collected in three classrooms, at one outdoor site on the school ground, and at one residence.

Personal monitoring is also part of the study. Selected students are wearing a passive VOC badge for 48 hours and completing a health status questionnaire to determine the incidence of asthma and allergy. Unfortunately, a large portion of the younger children have damaged the passive VOC badge; the return rate of personal VOC badges is correlated with the age of the student, with high school students being the most responsible. An interim report is expected in summer 2002, with the final report due in 2003. Contact: Dorothy Shimer (dshimer@arb.ca.gov).

Children's School Bus Exposure Study. The eight-week main field study for the School Bus Study will conclude in June, 2002. The urban bus routes used in the study included a primary route covering South Central Los Angeles and a secondary urban route further south from approximately Culver City to Carson. Both urban routes extensively covered minority and low-income communities as well as areas of high traffic density. A less congested non-urban route was covered in the trips from UC Riverside, where the bus was outfitted, to UCLA, near the start of the urban runs. UCLA and UC Riverside were the primary contractors for the study.

The study utilized many real-time instruments, including monitors for fine and ultrafine counts, PM_{2.5} and PM₁₀ mass, black carbon, particle-bound PAHs, CO, NO₂, and formaldehyde. PM, VOCs, and other aldehydes also were collected in integrated samples. A new addition from the pilot study was the use of a tracer gas, SF₆, introduced into the bus's exhaust to monitor for the intrusion of the bus's own emissions in the passenger cabin. Tracer gas results are hoped to aid in the difficult task of distinguishing a bus's own emissions from those of other surrounding traffic. The final report is expected by early next year. Contact: Scott Fruin (sfruin@arb.ca.gov).

California Population Indoor Exposure Model (CPIEM). ARB's Research Screening Committee approved the draft final report and user's guide on the work completed under the ARB contract, *Update and Refinement of an Indoor Exposure Assessment Methodology*, by the contractor ICF Consulting (SAI). CPIEM, which was developed in the early 1990s, serves as the core of this methodology. The contractor converted the model to a user-friendly, Windows interface and improved its efficiency; expanded estimation calculations; reviewed and incorporated new data into the model; and verified the accuracy of the improved model. The contractor also added the valuable capability of characterizing the uncertainty of the exposure estimates. The work completed under this project further improves and broadens ARB's ability to estimate Californians' exposures to air pollutants. Final revisions to the final report and user's guide will be made over the summer, and more data from recent studies will be added to the model as well. Contacts: Susan Lum (slum@arb.ca.gov), Scott Fruin (sfruin@arb.ca.gov)

The Fresno Asthmatic Children's Environment Study (FACES). FACES is an ARB-funded epidemiological study of the effects of air pollution on asthmatic children living in Fresno, CA conducted by investigators at the University of California, Berkeley. Air quality data is being collected at numerous locations as part of the five-year study, including at a central monitoring station, at two mobile trailers placed at selected schools, and inside and outside of a subset of subjects' homes. Limited personal monitoring also is being conducted. Recruitment efforts to enroll subjects in the study continue (with about 165 enrolled so far), as well as activities related to the ongoing panel visits and home intensive visits. The two FACES trailers began operating at two school locations in Fresno in early June, 2002, following an intensive evaluation of their instrument performance relative to instruments at the central air monitoring station. FACES home intensive monitoring began in February 2002, and is expected to continue until April 2003. A report on the progress and findings to date is expected to be available in December 2002. Contact: Jeff Yanosky (jyanosky@arb.ca.gov).

Indoor Air Chemistry: Cleaning Agents, Ozone, and Toxic Air Contaminants. This study aims to measure the reactivity of cleaning agent constituents and associated potential exposures to Toxic Air Contaminants from cleaning product use indoors. The proposal was approved by the Air Resources Board in March 2002, with work expected to begin in June 2002. The design involves a series of chamber emissions tests conducted at Lawrence Berkeley National Laboratory with and without the introduction of ozone under realistic indoor conditions. Cleaning products will be selected based on their reactivity, potential for emissions of Toxic Air Contaminants, and presence in the California marketplace. Contact: Jeff Yanosky (jyanosky@arb.ca.gov).

Characterization of the Composition of Personal, Indoor, and Outdoor Particulate Exposures. This study aims to quantify the components of particulate matter in outdoor and indoor concentrations and corresponding personal exposures. The study cohort consists of 15 subjects with chronic obstructive pulmonary disease in the Los Angeles, CA area. Concentrations of elemental carbon, particulate nitrate, and the elements, as well as total particle mass, were measured by investigators at the Harvard School of Public Health. Data analysis is in progress, and a final report is expected to be available in December 2002. Study results will aid in understanding the relationships between personal exposures and indoor and outdoor concentrations for several components of PM. Contact: Jeff Yanosky (jyanosky@arb.ca.gov).

Collaborative for High Performance Schools (CHPS). ARB staff met with CHPS members to comment on updates to the CHPS Best Practices Manual Section on building materials. An overview on material durability and life cycle emissions was added, along with a general discussion on the environmental impacts of vinyl flooring. ARB staff also met with a CHPS committee to begin developing an Operations and Maintenance volume for the Best Practices Manual. ARB provided references for previous guidance on operations and maintenance in schools and commercial buildings, and commented on the intended audiences, scope of work, and proposed budget for this new project. Contact: Tom Phillips (tphillip@arb.ca.gov).

Presentation at OEHHA's Children's Environmental Health Symposium. Peggy Jenkins

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presented an overview of past and current research funded by the ARB that has contributed, or will contribute, to our understanding of children's exposures to air pollutants and the resultant risk. Previous studies included the California Children's Activity Patterns Study and a "breathing study", both of which provided new input data for exposure and risk models. Results from these studies have been used extensively by Cal/EPA agencies, the U.S. EPA, and many others. Current studies are described in other entries of these minutes, and together will provide a wealth of new information on children's exposures in their schools, school buses, and homes. Contact: Peggy Jenkins (mjenkins@arb.ca.gov)

Proposed Ambient Particulate Matter Standards Report Released. Indoor Program staff revised the indoor and personal exposure portions of a staff report on the proposed revisions to the state ambient air quality standards for particulate matter (PM), and completed written responses to related comments received from the public on earlier drafts. The proposed standards include revisions to the current PM10 standard and the addition of a PM2.5 standard. PM takes a very serious toll on the health of our population; the proposed standards together are more protective than the current PM10 standard, in order to provide adequate protection of children, individuals with pre-existing heart and lung disease, and others who are especially sensitive to the harmful effects of PM. The PM standards staff report and related information is available at <http://www.arb.ca.gov/regact/aaqspm/aaqspm.htm>. The report was developed jointly by the ARB and OEHHA, and will be considered for approval by the Air Resources Board at their regularly scheduled public meeting on June 20, 2002, in El Monte. Contact: Peggy Jenkins (mjenkins@arb.ca.gov)

Web Page. Staff is redesigning the ARB's Indoor Air Quality Program web page so that it will be easier to use. A button menu will be available to select a variety of topics related to indoor air quality. It is hoped that the new web page will be up by the end of June. Contacts: Susan Lum (slum@arb.ca.gov), Dorothy Shimer (dshimer@arb.ca.gov).

California Department of Health Service / Environmental Health Investigations Branch -- Sandra McNeel (SMcNeel@dhs.ca.gov) <http://www.dhs.ca.gov/ps/deodc/ehib/>

Biological and Chemical Terrorism Preparedness: The U.S. Center for Disease Control and Prevention has recently awarded the Department of Health Services with additional supplemental funds to support preparedness activities. This grant will provide support for a Research Scientist II in the Occupational Health Branch, a Public Health Medical Officer II for the Division of Environmental and Occupational Disease Control, and a database manager. One of the issues that EHIB staff will be addressing is identifying and evaluating methods for assessment of chemical contamination in buildings. (Contact: Debra Gilliss, dgilliss@dhs.ca.gov)

Indoor fungal growth prevalence study: A question about the occurrence of indoor fungal growth was included in the 2001 California Behavior Risk Factor Survey and staff are currently analyzing the results. We will also be reviewing other data and resources on this topic (including

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literature on studies involving homes, schools and office buildings) and would appreciate assistance in identifying studies from less accessible sources. (Contact: Debra Gilliss dgilliss@dhs.ca.gov)

Consultation: Staff assisted CA Department of General Services (DGS) and other Department of Health Services staff with concerns arising from discovery of mold growth during replacement of the atrium roof in the Bateson Building, a DGS-owned structure in downtown Sacramento. We reviewed inspection reports, laboratory analyses and remediation protocols and attended open tenant meetings to provide information about health effects of indoor molds. Remediation protocol instituted full containment of the atrium work area and both mold removal and roof replacement are progressing (Contact: Sandy McNeel, smcneel@dhs.ca.gov)

Legislation: Senator Debra Ortiz has introduced language in the 2002 budget trailer bill to create a fund within the state Finance Department to accept voluntary contributions to fund Department of Health Services indoor mold-related activities (including, but not limited to SB 732 mandates). (Contact: Sandy McNeel smcneel@dhs.ca.gov)

Presentations:

- Sandy McNeel gave an update on health effects of indoor fungi and review of current status of mold-related legislation to physicians at U.C. Davis 21st Annual Occupational and Environmental Symposium, May 11, in Sacramento.
- Sandy McNeel also discussed the components and implementation status of the Toxic Mold Protection Act of 2001 at the combined 7th World Congress on Environmental Health and 51st Annual Educational Symposium of the California Environmental Health Association, May 21, in San Diego.

California Department of Health Service / Indoor Air Quality Section

-- Jed Waldman (JWaldman@dhs.ca.gov)

<http://www.cal-iaq.org>

Indoor Air 2002 Conference Papers. See [Appendix B](#).

BASE Study. DHS staff have met with the LBNL team to discuss common research interests (Apte, Cozen, Lipsett, Mendell; Tsai, Waldman). Presentations on BASE findings are being prepared for the following number of conferences and special forums.

Environmental Tobacco Smoke (ETS) Study. The project annual report has been submitted to TRDRP for 2001-02. LBNL will assist us on a very limited basis and in a advisory role during the out-of-state field work later this fall. In addition, we are planning to analyze the 2002 and 2003 CATS and 2002 CTS data. The analysis of the 1999 CTS and 2001 CTS data has been completed. Contact: Leon Alevantis, Lalevant@dhs.ca.gov.

Emissions of Building Materials With High-Recycled Contents. We have completed Phase I of the CIWMB-funded study to measure emissions of building materials with high recycled -

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content compared to "standard" products common to classroom construction. A total of 19 building materials were tested and a final draft of the Phase I report is due to the CIWMB on June 17th. PHI has started contacting manufacturers for samples to be tested in Phase II of the study. This phase focuses on material emissions of products common to state office building construction as well as recycled content products promoted as sustainable alternatives. In May the CIWMB approved additional funds for this study to measure emissions from tire-derived products, which will be tested during Phase II of the project. Contact: Leon Alevantis, lalevant@dhs.ca.gov.

Portable Classroom Study. Dust samples collected during Phase II field visits (~200 classroom) are being extracted and analyzed in the DHS-IAQS laboratory for allergen content (cockroach, house dust mite, cat and dog). Contact: Jed Waldman, jwaldman@dhs.ca.gov. [See related note under ARB.](#)

Sierra Radon Surveys. Staff is finalizing a report on Radon exposure studies recently concluding by DHS in the California Sierra Foothill region. The report will contain results of the 1999/2000 residential survey and 1999/2000 and 2000/01 elementary school surveys. Contact: Jed Waldman, jwaldman@dhs.ca.gov.

Committee Work:

- Leon Alevantis attended the ASHRAE 62 committee meeting on April 5-7. Among other items, the responses on Addendum "ad" were discussed and approved with minor modifications. The responses will be mailed to the reviewers.
- Since June 2001, the DHS-IAQ Program has been a member of the U.S. Green Building Council (<http://www.usgbc.org/>). Two papers are being planned for presentation at the first international GBC conference in Austin, TX next November. The first paper, co-authored with Anthony Bernheim and DGS staff, focuses on the sustainable features of the Capitol Area East End Complex. The second paper, co-authored with CIWMB staff, focuses on the results of Phase I of the emissions study.

Presentations:

- For the recent ASHRAE 62 committee meeting, the committee chairman asked Leon Alevantis to prepare a presentation to the committee on our ETS work. The presentation was given on April 6 and was well received by all interested parties.
- Janet Macher gave a training presentation at the American Industrial Hygiene Association — Northern California Section Professional Symposium on May 8th: "Bioterrorists know microbiology — shouldn't you? A review for environmental health professionals."

California Department of Health Service / Occupational Health Branch

<http://www.dhs.ca.gov/ohb/>

-- Jim Cone (Jcone@dhs.ca.gov), and Liz Katz (Ekatz@dhs.ca.gov)

Exposure Limits for Particulate Aerosols: Occupational and Environmental. HESIS industrial hygienist Elizabeth Katz presented "Particulates: An Occupational and Environmental Health Problem" at the Western Regional Epidemiology Network conference in Ashland, Oregon on May 16. New, strict ambient particulate matter exposure standards, issued by EPA and Cal/EPA, are based on new research findings. These findings appear to have relevance to occupational respiratory and circulatory disease.

Leaf Blower Operators: Respiratory Protection. In response to a request from ARB, HESIS reviewed pros and cons of respiratory protection options for landscape workers exposed to mixed particulates from leaf blowers. ARB will be publishing health and safety information for these workers. For landscape maintenance businesses, important barriers to effective respirator use include costs, hot-weather comfort, fitting and training. Landscape dusts contain variable amounts of soil, plant materials, molds and other decay organisms, and road dust; sometimes lead or other toxic dusts are also present.

California Department of Industrial Relations (Cal/OSHA)

-- Bob Nakamura (bnakamura@hq.dir.ca.gov)

<http://www.dir.ca.gov/dosh/>

Airborne Contaminants: 8CCR 5155. The Division is continuing to review Threshold Limit Value changes proposed by the ACGIH. The first meeting of the advisory committee was on May 4, 2001. The next meeting will be on June 17, 2002, in Oakland at the Elihu Harris state building headquarters. The Division coordinator is Bruce Wallace, who can be reached at 415-703-5165.

IAQ Advisory Committee. The Division is planning to review IAQ issues. When the first Advisory Committee completed its work, the intent was to await the Federal OSHA standard on IAQ. However, Federal OSHA recently removed IAQ from its long-term agenda. Consequently, the Division plans to review the recurrent issues relating to enforcing regulations that apply to indoor air quality situations. The first meeting is tentatively planned for Fall of 2002, in Oakland. For more information contact Bob Nakamura at 415-703-5160 or Deborah Gold at 415-703-5115.

Revision of the Sanitation Standard, GISO 3362. Last year, HESIS proposed language to the Division to change the sanitation standard to specifically identify mold as an unsanitary condition that must be corrected by the employer. This was proposed as a clarification to the existing standard to the Cal/OSHA Standards Board on September 20th. In response to the comments that were received on the proposal, the Board asked the Division to have an advisory meeting to consider more information about the proposal. This advisory meeting was held on Tuesday, November 13th at 10 AM in the Oakland State Building. A proposal was drafted at the meeting and noticed for public comment. No changes were made in response to comments, and this proposal will be

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reviewed at the Occupational Safety and Health Standards Board hearing in Sacramento on June 20, 2002. For information, contact Bob Nakamura at 415-703-5160.

The final proposal going to the Board is as follows:

Title 8, Calif. Code of Regulations; General Industry Safety Orders: Article 9 Sanitation, §3362. General Requirements.

(g) When exterior water intrusion, leakage from interior water sources, or other uncontrolled accumulation of water occurs, the intrusion, leakage or accumulation shall be corrected because of the potential for these conditions to cause the growth of mold.

California Integrated Waste Management Board / Green Building Program

-- Kathy Frevert (kfrevert@ciwmb.ca.gov) and Dana Papke (dpapke@ciwmb.ca.gov)

<http://www.ciwmb.ca.gov/GreenBuilding>

Vinyl Chloride in Buildings. The CIWM Board will be reviewing the Scope of Work and consider funding for an interagency agreement with OEHHA to conduct risk assessment related to the use of vinyl chloride in buildings and building products. The Board meeting is June 18-19. A final report would be anticipated for December 2003.

Web Site Resources. The Green Building Program web site includes a myriad of valuable resources, including a Sustainable Building Tool Kit for project managers.

California Office of Environmental Health Hazard Assessment / Indoor Air Risk Assessment Group -- Richard Lam (RLam@oehha.ca.gov)

<http://www.oehha.org/>

Indoor Air 2002 Conference Paper:

Household Environmental Tobacco Smoke (ETS) Exposure and Risk of Childhood Asthma: Techniques to Reduce Between-Study Heterogeneity in a Meta-Analysis, KL Vork, RL Broadwin, MJ Lipsett

Hot Spots Document. OEHHA is releasing a draft document, *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments* to solicit public comment. This draft Guidance Manual has been developed by OEHHA, in conjunction with the Air Resources Board, for use in implementing the Air Toxics Hot Spots Program (Health and Safety Code Section 44360). The draft Guidance Manual combines the critical information from the four Technical Support Documents onto a guidance manual for the preparation of health risk assessments. Public comment period has been extended until July 6, 2002. Public workshops will be held June 19th in Diamond Bar and June 25th in Oakland. The document can be downloaded at:

http://www.oehha.org/air/hot_spots/HRSGuide.html.

Chronic Reference Exposure Levels (RELs) for Airborne Toxicants. The Scientific Review Board reviewed a number of proposed chronic RELs and has endorsed 4 additional RELs, bringing the total number of chemicals for which chronic RELs are provided to 76 ppb. Additional RELs are currently undergoing review. The toxicants with new chronic RELs are fluorides (including hydrogen fluoride), phosphine, triethylamine, and carbon disulfide. Some of these chemicals are known or potential indoor air pollutants. The summaries are available at:

http://www.oehha.ca.gov/air/toxic_contaminants/meetingitems.html

http://www.oehha.ca.gov/air/chronic_rels/51702chrel.html

East Bay Children's Respiratory Health Study. This cross-sectional study of school- aged children examines the relationship between respiratory health and exposure to traffic-related air pollutants. Ten schools in a Northern California area based on their proximity to major roadways were selected. Approximately 1600 third and fourth graders participated. The child's respiratory health and his/her home environment will be assessed through parental responses (questionnaire). The neighborhood air monitoring study, which explores the spatial variability of pollutants in the neighborhoods where the study population resides, has been completed. We are now analyzing the databases with pollutant data covering all the air monitoring phases (Spring 2001, Fall 2001, and Spring 2002). We expect to release the final report soon. Contact: Janice Kim Jkim@oehha.ca.gov.

Ambient Air Quality Standards for Particulate Matter and Sulfates. The Staff of OEHHA and ARB released a report to the Air Quality Advisory Committee (AQAC) recommending standards for PM10 and PM2.5. Recommendations are:

- PM10 Annual-average Standard: 20 μ g/m³.
- PM10 24-hour-average Standard: 50 μ g/m³ (retain previous standard).
- PM2.5 Annual-average Standard: 12 μ g/m³.
- PM2.5 24-hour-average Standard: 25 μ g/m³.
- Sulfate 24-hour-average Standard: 25 μ g/m³ (retain previous standard).

The report "Public Hearing to Consider Amendments to the Ambient Air Quality Standards For Particulate Matter and Sulfates" is available online. The recommendations discussed in the report will be presented to the AQAC at a public meeting on June 20, 2002 in El Monte, CA. Information on the hearing is available at: <http://www.arb.ca.gov/board/directioelmonte.htm>, and the report is available at: <http://www.arb.ca.gov/research/aaqs/std-rs/pm-final/pm-final.htm>

Environmental Protection Indicators For California (EPIC). The EPIC project is a collaborative effort of the California Environmental Protection Agency (Cal/EPA), the Resources Agency, the Department of Health Services, and an external advisory group consisting of representatives from business, public interest groups, academia, and local government. The project, led by OEHHA is responsible for developing and maintaining a set of "environmental indicators" for California. OEHHA announces the availability of the following work products of the EPIC Project:

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Environmental Protection Indicators for California, April 2002 (Available as downloadable PDF files or in hard copy or CD-ROM versions). This [300-page report](#) describes the process for the identification and selection of environmental indicators that are adopted as part of the EPIC system, and presents the initial set of environmental indicators.

Environmental Protection Indicators for California: Understanding Environmental Conditions through Indicators, 2002. This [28-page document](#) highlights selected indicators from the full report, and is intended for a broad audience.

Presentations & Symposia

- *Children's Health Awareness Day* presentations from April 22, 2002 are available at: http://www.oehha.org/public_info/public/kids/kids%20health%20posters.html

- *The Impact of the Human Genome Project on Public Health and Environmental Protection*

Date: Tuesday, June 18, 2002, from 10 am to 4 pm.

Place: Central Valley Auditorium, Cal/EPA Headquarters, 1001 "T" Street, Sacramento.

No registration is necessary. Download a copy of the notice at:

http://www.oehha.ca.gov/public_info/genome.html

EPRI (formerly Electric Power Research Institute)

-- Annette Rohr (arohr@epri.com), (650) 855-2765

<http://www.epri.com>

Indoor Air 2002 Conference Papers.

- UPPER AIRWAY AND PULMONARY EFFECTS OF TERPENE OXIDATION PRODUCTS IN BALB/c MICE
Annette C. Rohr¹, Cornelius K. Wilkins², Per A. Clausen², Maria Hammer², Gunnar D. Nielsen², John D. Spengler³, and Peder Wolkoff²
¹ EPRI, Palo Alto, CA, USA
² National Institute of Occupational Health, Copenhagen, Denmark
³ Harvard School of Public Health, Department of Environmental Health, Boston, MA
- RESPIRATORY TRACT EFFECTS OF REPEATED EXPOSURES TO ISOPRENE/OZONE REACTION PRODUCTS IN MICE
Annette C. Rohr¹, Stephanie A. Shore², and John D. Spengler²
¹ EPRI, Palo Alto, CA, USA
² Harvard School of Public Health, Department of Environmental Health, Boston, MA

ISEE/ISEA 2002. EPRI is a conference sponsor, and has organized a symposium entitled "PM/Air Pollution Components and Health Effects: Current Epidemiological Findings". The chairs

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are Annette Rohr, EPRI and Rick Burnett, Health Canada. The program includes the following presentations:

- Identifying the Components of Air Pollution/PM Associated with Health Effects.
- Ambient Air Pollution and Respiratory Emergency Department Visits in Atlanta, August 1998 - August 2000 (ARIES/SOPHIA)
- ARIES: Air quality indicators and daily mortality -- two year results.
- Associations between particulate air pollution and acute respiratory visits in an ambulatory care setting.
- Ambient air pollution and arrhythmic events in patients with automatic implantable cardioverter defibrillators, Atlanta, 1993-2000.
- Health effects of fine and ultrafine particles: The Erfurt Studies.
- Ultrafine particle exposures and heart rate variability.
- Gaseous Criteria Pollutants Are Associated with Impaired Cardiac Autonomic Control.
- A preliminary study to assess the role of PM_{2.5} elemental composition and elemental carbon content on heart rate variability.
- Heart Rate Variability (HRV) changes associated with ambient air pollution in two sensitive cohorts living in Atlanta, GA.
- Personal, indoor and outdoor PM_{2.5} and its elemental composition associated with heart rate variability.

New EPRI Research Initiative: *Energy Efficiency and Improved Indoor Environmental Quality: Partners for Health, Productivity, and Economic Gains.* This initiative is currently in the early stages of development, having recently received internal seed funding. The objective/vision of the program is to advance understanding of the economic and health impacts of technologies which simultaneously improve IEQ and reduce energy consumption in the built environment. The program is comprised of three components, all designed to quantify the direct (energy usage) and indirect (occupant health, comfort, and productivity) effects of interventions in the indoor environment: (1) Integrated Economic Analysis of Energy Efficient and Green Buildings; (2) Sensor Technologies for Energy Efficiency and Improved IEQ; and (3) Control Electrotechnologies for Improved Indoor Air Quality. From a utility industry standpoint, the research will increase public awareness of utility leadership in efficient and sustainable resource use and integrated IEQ design; maximize efficiency and benefits of electric power usage for customers; and improve health and productivity of utility employees. The program has met with very favorable reviews from EPRI members and we are now working with several companies to identify suitable demonstration buildings. Other activities currently underway include identification of academic/industry partners and development of comprehensive research plans for the three components.

Lawrence Berkeley National Laboratory / Indoor Environments Program

-- Mike Apte (MGAPte@lbl.gov)

<http://eetd.lbl.gov/iep/iep.html>

Indoor Air 2002 Conference Papers. LBNL-IED staff will present 31 papers at the Monterey Conference. See [Appendix A](#).

Energy Efficiency and Indoor Environmental Quality in New Relocatable Classrooms in Northern California. Three projects being conducted by LBNL with school districts and DEG for the CEC High Performance Commercial Building Systems Program-Element 6 and CEC Public Interest Energy Research Funding, continue on track. Preliminary energy modeling of standard versus advanced HVAC performance across CA climate zones has been completed with DOE-2. The main field work components, ten weeks in each of the fall 2001 cooling and winter 2002 heating seasons, were completed. A field technician visits school sites for maintenance, HVAC system alternation, and to download continuously monitored IEQ and energy data once every ~2-3 weeks during 11-12/01 and mid-March to mid-June transitional periods. Extra thermal comfort measurements are being conducted in May given increased cooling demands. CO2 decay experiments followed by short-term VOC and target aldehyde measurements were conducted three times (late 8/01, late 10/01, and mid-3/01). The purpose was to calculate air exchange rates and emission factors of the standard and alternate interior materials and finishings in unoccupied RCs under "steady-state" ventilation conditions. Data sets were managed, cleaned, and prepared for descriptive statistics and regression models in SAS during spring 2002. There will be multiple presentations on these projects at Indoor Air 2002 and ISEA-ISEE 2002. Contacts: Michael Apte, mgapte@lbl.gov, Derek Shendell, dgshendell@lbl.gov.

Stanford University / Department of Statistics

-- Wayne Ott (wayne@stat.stanford.edu)

Mixing in Indoor Microenvironments. Wayne Ott, Paul Switzer, and Sandra McBride are studying the rate at which pollutants from point sources mix in indoor microenvironments. Understanding the mixing characteristics and indoor pollutant movement is useful for understanding the uniform mixing assumption incorporated in the mass balance model used to predict indoor concentrations. This research is analyzing prior data from experiments measuring "first hit" times, or the times at which a pollutant first reaches a set of sensitive monitors located at fixed distances on either side of an indoor point source. A paper on indoor micro-plumes and first-hit statistics has been accepted for Indoor Air 2002 in July in Monterey, CA.

Personal Exposure Studies on PM. Wayne Ott signed a legal confidentiality agreement with Ethyl Corporation to permit exposure modeling using the PM-2.5 particulate concentration exposure data from Ethyl's studies of personal exposure and indoor air quality in Toronto, Canada, and Indianapolis, IN. These data will be used to test the Random Component Superposition (RCS) model using PM-2.5 data from these two cities, and the results will be compared with the EPA Particle Total Exposure Assessment Methodology (PTEAM) indoor PM-2.5 data collected in Riverside, CA. The RCS model allows partitioning of personal exposure measurements and indoor air quality into two component parts: the contribution of indoor sources and ambient air infiltrating indoors. The Toronto and Indianapolis PM-2.5 data have not previously been available for exposure modeling, because they were covered by a Confidential Business Agreement between EPA and Ethyl

Corp. that limited their access. A scientific paper applying the RCS exposure model to these new PM-2.5 data sets is being written with Lance Wallace of EPA and has been accepted for the August ISEA 2002 Annual Meeting in Vancouver.

Indoor Source Characterization. Wayne Ott and Hans Siegmann are analyzing the ratios of real time particulate measurements comparing particulate diffusion charging and photoionization monitors. Sources of fine particles and particulate polycyclic aromatic hydrocarbons (PPAH), such as incense, environmental tobacco smoke, motor vehicles, cooking, and wood burning are hypothesized to have different photoelectric to diffusion charging (PC/DC) ratios, and the data from prior experiments with these sources are being compared. Characterization of PC/DC ratios should allow different sources to be identified in particulate exposure measurements for source apportionment modeling. A paper on indoor source characterization and indoor source strengths has been accepted for presentation at the August ISEA Annual Meeting in Vancouver. The source strength results can be used in particulate exposure models, such as EPA's SHEDS-PM model.

U.S. EPA Region IX / Indoor Environment Team

<http://www.epa.gov/iaq/>

- Barbara Spark (spark.barbara@epamail.epa.gov)
- Bill Jones (jones.bill@epamail.epa.gov)

Indoor Air 2002 Conference Paper. Bob Axelrad and Bill Jones will be presenting a paper entitled, "Toward Comprehensive Federal Guidelines for School Environmental Health."

IAQ Tools for Schools. The Indoor Environments Team (indoor air), working in collaboration with Bill Jones, has been immersed in rolling out the special four district *IAQ Tools for Schools* projects initiated by our Regional Administrator Wayne Nastri. This has involved steps to move forward on partnerships with statewide organizations of school administrators and school boards, development work at individual districts, and significant progress in the ongoing *IAQ Tools for Schools* program at LAUSD. Pilot schools are in progress at each of the eleven LAUSD sub-districts, and new mechanisms are being established to greatly accelerate program roll-out.

Homeland Security and IAQ. In January of this year, the Office of Homeland Security (OHS) formed the Interagency Workgroup on Building Air Protection, including representatives from agencies across the Federal government. U.S. EPA is the Executive Secretariat of this Workgroup, which is chaired by OHS. One of the first tasks of the Workgroup was to produce guidance to building owners and managers that would contain a set of recommendations they could implement now to better protect the indoor environments of their buildings from terrorist threats. The National Institute of Occupational Safety and Health (NIOSH), in close collaboration with Workgroup members, took on the task of drafting the document, ***Guidance for Protecting Building Environments from Airborne Chemical, Biological, or Radiological Attacks***. A link to the full text of the document and information about this and other pertinent resources can be accessed via the U.S. EPA Indoor Environments Division page, "Homeland Security and the Indoor

Environment," <http://www.epa.gov/iaq/ohs.html>.

Asthma/IAQ. In a non-EPA event which has wide-ranging potential for indoor air and asthma issues in California, a press conference took place in LA to announce findings of a statewide asthma survey funded by the California Endowment (the state's largest foundation), as well as to announce the grantees of the \$12 million three-year Community Action to Fight Asthma (CAFA) project (for which Barbara Spark participated at an advisory meeting last year). These grants are in support of community projects to address environmental issues in asthma, either ambient air pollution, or to address asthma triggers and indoor air pollution in homes or schools. Project strategies will be developed in the first year, and implemented in years two and three. Some of the coalitions may elect to take on indoor air quality in schools. The Director of CAFA is our long-time colleague, Megan Webb, outgoing Executive Director of RAMP (Regional Asthma Management and Prevention Initiative, <http://www.rampasthma.org>). The California Health Interview Survey has generated a great deal of press coverage, as it has established valuable county-by-county data on asthma prevalence. The CA Endowments press release, including many links to the survey and the CAFA project, can be viewed at http://www.calendow.org/news/frm_news.htm

Asthma/Mold. Barbara Spark provided a workshop on mold/asthma for the monthly Community Health Worker meeting sponsored by RAMP. A number of asthma program managers also attended, including the coordinators of the Oakland and Contra Costa Community Action to Fight Asthma (CAFA) projects (the latter being the new Program Manager for Chronic Disease Prevention of Contra Costa County. We are working with RAMP to organize a meeting/workshop on indoor air/asthma programs with all five N. CA CAFA coalitions.

Literature Review on Fragrance. Barbara alerted the group of a paper published in *Flavour and Fragrance Journal*, written by Betty Bridges and entitled, ***Fragrance: Emerging Health and Environmental Concerns***. The paper can be found on-line at <http://www.fpinva.org/FragranceReview.htm>.

WORKING GROUP COMMITTEES

Indoor Environmental Quality of Schools

-- Jed Waldman (JWaldman@dhs.ca.gov)

Legislation. AB 2223, authored by Assemblyman Fred Keeley (D-Santa Cruz) was successfully passed out of the Assembly, and it is now awaiting committee review in the Senate. The current version (May 23) eliminates the IAQ standards proposed in the Introduced (Feb. 20) version. Instead, the bill directs the State & Consumer Services Agency, in consultation with numerous other agencies including ARB and DHS, to develop separate voluntary guidelines for school design and school operation and maintenance. See http://www.leginfo.ca.gov/cgi-bin/postquery?bill_number=ab_2223&sess=CUR&house=B.

Collaborative for High Performance Schools. The collaborative stakeholders recently met to discuss development of operation & maintenance manual for the Best Practices Manual, including issues on IAQ and ventilation. [See related note under ARB.](#) CHPS documents are available at the web site: <http://www.chps.net/>.

Building Design and Operations

-- Leon Alevantis (LAlevant@dhs.ca.gov)

Capitol Area East End Complex. A first draft of the indoor air quality sampling plan has been developed by Clark/Gruen for Blocks 171-174. A revised plan will be presented to the State on June 17. IAQ sampling on the 6th floor of Block 225 before and after installation of the workstations has been completed. DGS has agreed to additional sampling on the 3rd floor right before the flush out and at few times during the flush out in order to determine the decay rate of VOCs for future projects. Sampling on all furnished floors will occur shortly before occupancy and after completion of the flush-out. At a recent Sustainable Building Task Force meeting the building manager of the Cal-EPA building gave a short presentation of the IAQ sampling at that building. In addition, at a recent meeting with our Director, this issue was discussed as well. The IAQ Section is planning sampling of the indoor air after occupancy – the level of effort will depend on amount of external funding. The most recent quarterly report on the CAEEC to the Legislature's Joint Rules Committee can be found on-line at:

<http://www.legi.dgs.ca.gov/reports2002/East%20End%20Report--January%202002.pdf>

Sustainable Building Task Force. Recently, the Taskforce has met a number of times to discuss the update of the Tier 1 and 2 lists. A number of IAQ items are being modified or added. The Task Force is continuing to discuss proposed changes throughout these Lists

FUTURE MEETINGS

Upcoming meetings of the CIWG-IAQ are scheduled as follows:

- September 18, 2002, CalEPA Building, 10th & I St., Sacramento
- December 11, 2002, TBA
- March 12, 2003, TBA
- June 12, 2003 TBA

APPENDIX A

LBNL-IED Indoor Air 2002 Papers

Ventilation and IAQ Studies

1. MG Apte, AT Hodgson, DG Shendell, D Dibartolomeo, T Hochi, S Kumar, SM Lee; SM Liff, LI Rainer, RC Schmidt, DP Sullivan, RC Diamond, WJ Fisk (2002) Energy and indoor environmental quality in relocatable classrooms.
2. D Faulkner, WJ Fisk, DP Sullivan, SM Lee (2002) Ventilation efficiencies of a desk-edge-mounted task ventilation system.
3. WJ. Fisk, G Brager, M Brook, H Burge, J Cole, J Cummings, H Levin, V Loftness, T Logee, MJ Mendell, A Persily, S Taylor, J Zhang (2002) A priority agenda for energy-related indoor environmental quality research.
4. AT Hodgson, D Faulkner, DP Sullivan, DL DiBartolomeo, ML Russell and WJ Fisk (2002) Effect of outside air ventilation rate on VOC concentrations and emissions in a call center.
5. R Prill, and WJ Fisk (2002) Long term performance of radon mitigation systems.
6. ML Russell, RG Goldstein, MG Apte and WJ Fisk (2002) Method For Measuring The Size Distribution Of Airborne Rhinovirus.
7. O Seppanen and WJ Fisk (2002) Relationship Of SBS-Symptoms and Ventilation System Type in Office Buildings.

Air Flow and Pollutant Transport Modeling

8. CC Federspiel, H Li, DM Auslander, D Lorenzetti, AJ Gadgil (2002) Modeling Transient Contaminant Transport In HVAC Systems And Buildings.
9. C Lobscheid, AJ Gadgil (2002) Mixing Of A Point-Source Indoor Pollutant: Numerical Predictions And Comparison With Experiments.
10. DM Lorenzetti (2002), Assessing Multizone Airflow Simulation Software.
11. RG Sextro, DM Lorenzetti, MD Sohn, and TL Thatcher (2002) Modeling the spread of anthrax in buildings.
12. MR Sippola and WW Nazaroff (2002) Modeling Particle Deposition In Ventilation Ducts.

13. MD Sohn, PReynolds, AJ Gadgil and RG. Sextro (2002), Rapidly Locating Sources And Predicting Contaminant Dispersion In Buildings.

Environmental Tobacco Smoke

14. MG Apte, LA Gundel, RL Dod, GM Chang, and RG Sextro (2002) A pilot study of the behavior of gas- and particle-phase ETS tracers in residences.
15. NE Klepeis and WW Nazaroff, (2002) Characterizing Size-Specific ETS Particle Emissions.
16. WW Nazaroff and BC Singer (2002) Inhalation Of Hazardous Air Pollutants From Environmental Tobacco Smoke In Us Residences.
17. BC Singer, AT Hodgson, and WW Nazaroff (2002), Effect Of Sorption On Exposures To Organic Gases From Environmental Tobacco Smoke (ETS).
18. AM Webb, BC Singer, And WW Nazaroff (2002) Effect Of Gaseous Ammonia On Nicotine Sorption.
19. J Wagner, DP Sullivan, D Faulkner, LA Gundel, WJ Fisk, LE Alevantis, and JM Waldman (2002) Measurements and Modeling of Environmental Tobacco Smoke Leakage from a Simulated Smoking Room.

Exposure, Health and Productivity Studies

20. CA Erdmann, KC Steiner, and MG Apte (2002) Indoor carbon dioxide concentrations and SBS symptoms in office buildings revisited: analyses of the 100 building BASE Study dataset.
21. CC Federspiel, G Liu, M Lahiff, D Faulkner, DL Dibartolomeo, WJ Fisk, PN Price, DP Sullivan (2002) Worker performance and ventilation: analyses of individual data for call-center workers.
22. WJ Fisk, PN Price, D Faulkner, DP Sullivan, DL Dibartolomeo, CC Federspiel, G Liu, and M Lahiff (2002) Worker performance and ventilation: analyses of time-series data for a group of call-center workers.
23. GA Heath and MJ Mendell (2002) Do Indoor Environments In Schools Influence Student Performance? A Review Of The Literature.
24. AT Hodgson, MG Apte, DG Shendell, D Beal and JER McIlvaine (2002) Implementation Of VOC Source Reduction Practices In A Manufactured House And In School Classrooms.

25. MJ Mendell, GM Naco, TG Wilcox, and WK Sieber (2002) Building-related risk factors and work-related lower respiratory symptoms in 80 office buildings.

Factors Affecting Indoor Exposures to Particles of Outdoor Origin

26. ML Fischer, MM Lunden, TL Thatcher, RG Sextro, And NJ Brown (2002) Predicting Indoor $PM_{2.5}$ Of Outdoor Origin: Testing a transient size-resolved Model Using Intensive Measurements From A Residence
27. SV Hering, MM Lunden, TW Kirchstetter, TL Thatcher, KL Revzan, RG Sextro, NJ Brown, J Watson and J Chow, (2002) Indoor, Outdoor And Regional Profiles Of $PM_{2.5}$ Sulfate, Nitrate And Carbon.
28. DL Liu and WW Nazaroff, (2002) Particle Penetration Through Windows.
29. MM Lunden, TL Thatcher, D Littlejohn, ML Fischer, SV Hering, RG Sextro, And NJ Brown (2002) The Transformation Of Outdoor Ammonium Nitrate Aerosols In The Indoor Environment.
30. TE. McKone, TL. Thatcher, WJ. Fisk, and RG. Sextro (2002) Factors affecting the concentration of outdoor particles indoors: existing data and data needs.
31. TL Thatcher, MM Lunden, RG Sextro, S Hering, and NJ Brown (2002) The effect of penetration factor, deposition, and environmental factors on the indoor concentration of $PM_{2.5}$ sulfate, nitrate, and carbon.

APPENDIX B

CDHS-IAQ Indoor Air 2002 Papers

CONCENTRATIONS OF AIRBORNE BACTERIA IN 100 U.S. OFFICE BUILDINGS. Feng C. Tsai¹, Janet M. Macher^A, Y-Y Hung²

CONCENTRATIONS OF CAT AND DUST MITE ALLERGENS IN 93 U.S. OFFICE BUILDINGS. Janet M. Macher^A, Feng C. Tsai¹, Lauren Burton³, and Kai-Shen Liu^A

HOW PUBLIC AGENCIES ADDRESS INDOOR MOLD HAZARDS IN CALIFORNIA. Jed M. Waldman^A, Janet M. Macher^A, Sandy McNeel^B, Emily Wersinger, and Debra Gilliss^B

INSPECTOR-REPORTED AND OBJECTIVE MEASUREMENT OF INDOOR MOISTURE IN HOMES OF ASTHMATIC CHILDREN. Phil Lowenthal⁴, K Mortimer⁴, Kathie Hammond⁵, Janet M. Macher^A, and Ira Tager⁴

MEASUREMENTS AND MODELING OF ENVIRONMENTAL TOBACCO SMOKE LEAKAGE FROM A SIMULATED SMOKING ROOM. Jeffrey Wagner^A, David Sullivan⁶, David Faulkner⁶, Lara Gundel⁶, William Fisk⁶, Leon E. Alevantis^A, and Jed M. Waldman^A

SPECIAL ENVIRONMENTAL REQUIREMENTS FOR A CALIFORNIA STATE OFFICE BUILDING. Anthony Bernheim⁷, Hal Levin⁸, Leon E. Alevantis^A

SUSTAINABLE BUILDING PRACTICES IN CALIFORNIA STATE BUILDINGS. Leon E. Alevantis^A, Kathy Frevert⁹, Rick Muller¹⁰, Hal Levin⁸, and Arnold Sowell¹¹

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